

Appl SN 10/568,059
Amdt. to Office Action dated Mar. 20, 2009

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Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) A liquid drop placing apparatus comprising:
 - an ink jet head;
 - a substrate receiving a liquid drop discharged from the ink jet head;
 - a device for irradiating or reflecting light from a nozzle hole or its vicinity of the ink jet head toward the substrate;
 - a position moving device for controlling a relative position between the ink jet head and the substrate; and
 - a control device for discharging a liquid from the ink jet head;
 - wherein a light-receiving element for recognizing a position of the ink jet head is disposed behind the substrate, when seen from the ink jet head,
 - the substrate has a transparency at least to a degree that the irradiated light or the light reflected from the nozzle hole or its vicinity toward the substrate enters the light-receiving element, and
 - the light-receiving element senses the irradiated light or the light reflected from the nozzle hole or its vicinity toward the substrate,
 - wherein the ink jet head comprises a system for irradiating light from an inside of the nozzle hole discharging the liquid toward the substrate, and
 - wherein the system for irradiating the light from the inside of the nozzle hole toward the substrate comprises the nozzle hole, a pressure chamber for generating a pressure for discharging the liquid from a nozzle, a flow channel for supplying the liquid to the pressure chamber, a container for storing the liquid and a tube for transporting the liquid from the container to the flow channel, and
 - a surface that the liquid contacts is formed of a light-reflecting material, and light from a light source is brought into the container and guided to the nozzle hole.

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2. (Previously Presented) The liquid drop placing apparatus according to claim 1, further comprising a system for moving the light-receiving element as one piece with the substrate with a movement of the substrate.

3. (Previously Presented) The liquid drop placing apparatus according to claim 1, wherein a reflector plate that is semi-transparent to light is provided between the substrate and the light-receiving element,

a light source is provided for making light parallel with a surface of the substrate incident onto the reflector plate, and

the reflector plate is disposed and adjusted so as to reflect a part of the incident light in a direction of the ink jet head and transmit a part of the light reflected from the ink jet head on a side of the light-receiving element.

4. (Canceled)

5. (Canceled)

6. (Previously Presented) The liquid drop placing apparatus according to claim 1, wherein the substrate is a glass or a resin.

7. (Previously Presented) The liquid drop placing apparatus according to claim 1, wherein the ink jet head is a head for discharging the liquid by a vibration using a piezoelectric element or a head for discharging the liquid by an air bubble generation caused by a thermic effect.

8. (Currently Amended) A liquid drop placing method in which a liquid is discharged from an ink jet head and placed to a surface of a substrate, the method comprising:

disposing a light-receiving element on a liquid discharge side of the ink jet head;

disposing the substrate between the ink jet head and the light-receiving element before discharging the liquid;

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setting a relative position between the ink jet head and the substrate based on the determined information, and

placing the liquid to the substrate,

wherein the ink jet head comprises a system for irradiating light from an inside of a nozzle hole discharging the liquid toward the substrate, and

wherein the system for irradiating the light from the inside of the nozzle hole toward the substrate comprises the nozzle hole, a pressure chamber for generating a pressure for discharging the liquid from a nozzle, a flow channel for supplying the liquid to the pressure chamber, a container for storing the liquid and a tube for transporting the liquid from the container to the flow channel, and

a surface that the liquid contacts is formed of a light-reflecting material, and light from a light source is brought into the container and guided to the nozzle hole.

9. (Previously Presented) A liquid drop placing method according to claim 8, further comprising a system for moving the light-receiving element as one piece with the substrate with a movement of the substrate.

10. (Previously Presented) The liquid drop placing method according to claim 8, wherein a reflector plate that is semi-transparent to light is provided between the substrate and the light-receiving element,

a light source is provided for making light parallel with the surface of the substrate incident onto the reflector plate, and

the reflector plate is disposed and adjusted so as to reflect a part of the incident light in a direction of the ink jet head and transmit a part of the light reflected from the ink jet head on a side of the light-receiving element.

11. (Canceled)

12. (Canceled)

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13. (Previously Presented) The liquid drop placing method according to claim 8, wherein the substrate is a glass or a resin.

14. (Previously Presented) The liquid drop placing method according to claim 8, wherein the ink jet head is a head for discharging the liquid by a vibration using a piezoelectric element or a head for discharging the liquid by an air bubble generation caused by a thermic effect.